2005 IAP

Volunteer Army Ammunition Plant

Installation Action Plan

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Chattanooga, Tennessee

Document printed on 10 September 2004

Statement of Purpose

The purpose of the Installation Action Plan (IAP) is to outline the total multi-year restoration program for the expeditious transfer of all property in an environmentally sound condition with appropriate land use controls and in accordance with the future reuse. The plan will define Installation Restoration Program (IRP) requirements and propose a comprehensive approach and associated costs to conduct future investigations and remedial actions at each Solid Waste Management Unit (SWMU) at the installation and other areas of concern (AOCs).

In an effort to coordinate planning information between the IRP manager, the U.S. Army Environmental Center (USAEC), installations, executing agencies, regulatory agencies, and the public, an IAP has been completed for the Volunteer Army Ammunition Plant (VOAAP). The IAP is used to track requirements, schedules and tentative budgets for all major Army installation restoration programs.

All site specific funding and schedule information has been prepared according to projected overall Army funding levels and is therefore subject to change during the document's annual review. Under current project funding and assumptions regarding site conditions, all remedies will be in place at the VOAAP by the end of 2008.

The following persons contributed to the formulation and completion of this 2005 Installation Action Plan for Volunteer Army Ammunition Plant during a planning workshop held on 22 April, 2004:

Engineering and Environment, Inc.

HQDA BRAC - Atlanta Field Office

Shaw Environmental & Infrastructure, Inc.

Tennessee Department of Environment and Conservation

Tennessee Department of Environment and Conservation - Division of Superfund

Tetra Tech, Inc.

U.S. Army Corps of Engineers, Mobile District

U.S. Army Environmental Center

U.S. Environmental Protection Agency, Region IV

Volunteer Army Ammunition Plant Restoration Advisory Board

Volunteer AAP Restoration Division

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Acronyms & Abbreviations

ACSIM	Army Chief of Staff for Installation Management
AEDB-R	Army Environmental Database,
AOC	Area of Concern
As	Arsenic
bgs	below ground surface
BRAC	Base Realignment and Closure Action
CAD	Computer assisted design
CE	Corps of Engineers
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFI	CF Industries, Inc.
CMI	Corrective Measures Implementation
CMI(C)	Corrective Measures Implementation (Construction)
CMI(O)	Corrective Measures Implementation (Operation)
CMS	Corrective Measures Study
COE	Corps of Engineers
cPAH	Carcinogenic Polyaromatic Hydrocarbons
CS	Confirmation Study
cy	cubic yards
DD	Decision Document
DES	Design
DNT	Dinitrotoluene
EBS	Environmental Baseline Survey
EPIC	Environmental Photographic Interpretation Center
ER,A	Environmental Restoration, Army
ESA	Environmental Site Assessment
FEIS	Final Environmental Impact Statement
FS	Feasibility Study
FY	Fiscal Year
GAC	Granular Activated Carbon
GOCO	Government Owned Contractor Operated
GS	Gypsum Sludge
GSA	General Services Administration
GW	Groundwater
IAP	Installation Action Plan
ICM	Interim Corrective Measures
IDW	Investigation Derived Waste
IRA	Interim Remedial Action
IRP	Installation Restoration Program
LF	Landfill
LTM	Long Term Monitoring
LUC	Land use controls
MACOM	Major Army Commands
MIIF	Maintenance of Inactive Industrial Facilities
MSC	Major Support Commands
MNA	Monitored Natural Attenuation
MW	Monitoring well
NE	Not Evaluated
NFA	No Further Action
NPL	National Priority List
OMA	Operations and Maintenance-Army
OSC	Operational Support Command
OU	Operable Unit
PA	Preliminary Assessment
PAH	Polyaromatic Hydrocarbons
Pb	Lead
PCB	Polychlorinated Biphenyls
PRG	Preliminary Remediation Goals
RA	Remedial Action
RA(C)	Remedial Action - Construction
RA(O)	Remedial Action - Operation
RAB	Restoration Advisory Board
RC	Response Complete
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
REM	Removal
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RI	Remedial Investigation
RIP	Remedy in place
RPM	Remedial Program Manager
RRSE	Relative Risk Site Evaluation
RWA	Redwater Ash
S&A	Supervision and Administration
S&R	Supervision and Review
SHPO	State Historic Preservation Office
SI	Site Investigation
SVOC	Semi-Volatile Organic Compounds
SWMU	Solid Waste Management Unit
TDEC	Tennessee Department of Environment and Conservation
TNT	Trinitrotoluene
TPHC	Total Petroleum Hydrocarbons
ug/l	micrograms per liter
USACE	U.S. Army Corps of Engineers
USAEC	U.S. Army Environmental Center
USATHAMA	United States Army Toxic and Hazardous Material Agency (currently called USAEC)
USEPA	U.S. Environmental Protection Agency
UXO	Unexploded Ordnance
VAAP	Volunteer Army Ammunition Plant
VOAAP	Volunteer Army Ammunition Plant
VOC	Volatile Organic Compounds

Conversion Charts

AEDB-R to SWMU and AOC CONVERSION

VAAP-01		AOC 1
VAAP-02	SWMU 7	
VAAP-03		AOC 2
VAAP-05		AOC 7
VAAP-15	SWMU 9	
VAAP-16	SWMU 4	
VAAP-18	SWMU 3	
VAAP-20	SWMU 1	
VAAP-21	SWMU 2	
VAAP-23	SWMU 5	
VAAP-32		AOC 3, 4, 9, 10, 10B
VAAP-33	SWMU 6	
VAAP-35		AOC 6
VAAP-36	SWMU 12	
VAAP-37		AOC 14

CERCLA and RCRA Acronym Conversions

CERCLA		**RCRA**
Preliminary Assessment (PA)	=	RCRA Facility Assessment (RFA)
Site Investigation (SI)	=	Confirmation Study (CS)
Remedial Investigation/ Feasibility Study (RI/FS)	=	RCRA Facility Investigation/Corrective Measures Study (RFI/CMS)
Remedial Design (RD)	=	Corrective Measures Implementation (Work Plan) (DES)
Remedial Action (Construction) (RA(C))	=	Corrective Measures Implementation (Construction) (CMI(C))
Remedial Action (Operations) (RA(O))	=	Corrective Measures Implementation (Operation) (CMI(O))
Long Term Monitoring (LTM)	=	Long Term Monitoring (LTM)
Interim Remedial Action (IRA)	=	Interim Corrective Measure (ICM)

Summary

STATUS:	Non NPL-IRP Under State Superfund
TOTAL # OF AEDB-R SITES:	20 AEDB-R sites
ACTIVE ER,A SITES:	12 Active ER,A Sites (as of 21 Oct 04)
RESPONSE COMPLETE (RC) SITES:	8 Response Complete Sites (as of 21 Oct 04)
DIFFERENT SITE TYPES:	4 Contaminated Buildings 1 Contaminated Groundwater 5 Spill Site Areas 1 Surface Impoundment/Lagoons 4 Landfills 2 Burn Areas 1 Pistol Range
CONTAMINANTS OF CONCERN:	Explosives, Metals, PCB, PAH, VOC, SVOC, TPHC, Vanadium Pentoxide
MEDIA OF CONCERN:	Groundwater, Soil, Sediment, Surface Water
COMPLETED REM/ICM/CMI:	• Remedial - Connecting five off-post residents to public water supply, 1995-96. • Sanitary Landfill was closed per a 1996 letter from TDEC. • Burning Ground was closed in 1999. • Western Magazine Removal Action in 2001. • Burn Cages Removal Action in 2003. • AOC 10B Interim Measure in 2004. • Redwater Ash Handling Area closed in 2004. • Pellet Disposal Area (AOC 4) Interim Measure in 2004. • World War II Burning Ground (SWMU 4) was closed with No Further Action in 2004.
CURRENT IRP PHASES:	RFI/CMS: 4 sites DES: 2 sites CMI(C): 3 sites *(Includes all AEDB-R Sites. Total Number of AEDB-R sites are different from Phase Totals as one site can be in more than one phase)*
PROJECTED IRP PHASES:	CMS: 1 site DES: 2 sites CMI(C): 6 sites LTM: 5 sites *(Includes all AEDB-R Sites. Total Number of AEDB-R sites are different from Phase Totals as one site can be in more than one phase)*
IDENTIFIED POSSIBLE REM/ICM/CMI:	VAAP-01, 02, 20, 21, 31, 32, 35
DURATION:	Year of IRP Inception: **1980** Year of RA Completion Excluding LTM: **2008** Year of IRP Completion Including LTM: **2020**

Installation Information

SITE DESCRIPTION:

Volunteer AAP occupies a total of 17,098 acres in eastern Hamilton County, Tennessee, approximately 10 miles northeast of Chattanooga's central business district. The surrounding areas of Hamilton County and Chattanooga have expanded to include the development of residential, commercial, and industrial areas in the vicinity of VOAAP.

COMMAND ORGANIZATION:

ACSIM (Army Chief of Staff for Installation Management)

INSTALLATION: Volunteer AAP Installation Management Division

IRP EXECUTING AGENCIES:

- U.S. Army Base Realignment & Closure Office
- U.S. Army Corps of Engineers, Mobile District

REGULATORY PARTICIPATION:

STATE: Tennessee Department of Environment and Conservation (TDEC)

FEDERAL: U.S. Environmental Protection Agency Region IV (lead agency)

REGULATORY STATUS:

- USEPA in consultation with TDEC determined facility was subject to RCRA and issued RCRA 3008(h) Order on Dec 4, 2001.
- CERCLA (Non-NPL)
- Promulgated State Superfund site

MAJOR CHANGES TO IAP FROM PREVIOUS YEAR (2004):

- Interim Measures were completed at two sites (Pellet Disposal Area [AOC 4} and AOC 10B) and a third site (Redwater Ash Handling Area) was closed with supplemental sampling.
- World War II Burning Ground (VAAP-16) and New Acid Area (VAAP-33) sites closed with No Further Action in 2004.

Installation Information

DESCRIPTION:

Volunteer AAP is a government-owned and contractor-operated (GOCO) facility for the production and storage of trinitrotoluene (TNT). The installation is currently in inactive excess status.

HISTORY & MISSION:

The Corps of Engineers built the original TNT production facility between 1941 and 1943. The plant included 16 TNT batch process lines and related acid facilities (nitric and sulfuric acids). Initial operations began in July 1942 with Hercules Powder Company of Wilmington, Delaware, as the operating contractor. The plant continued production until 1945; by then, over 800,000,000 pounds of TNT had been produced. The plant was then placed in standby status from January 1946 until the spring of 1952. During this period of time, the government maintained the plant.

In the spring of 1952, the plant was reactivated in support of the Korean War. Operation was awarded to the Atlas Powder Company of Wilmington, Delaware. More than 283,000,000 pounds of TNT were produced from 1953 until the plant was shutdown and placed in standby status in 1957. The plant was again reactivated in 1965 as a result of the Vietnam War. Ten of the old TNT batch processing lines were operated until 1969 when the production requirements began to decrease. After 1969, the number of batch processing lines in operation was subsequently reduced until all production using the old batch TNT lines ceased in 1975.

New acid facilities were built between 1970 and 1972, and the modernization of the TNT production facilities was conducted between 1971 and 1975 when six new continuous process lines were built in an area where four of the old batch process lines were previously razed. Only one of the new continuous process lines, however, was ever operated from 1974 until 1977, when the last TNT production occurred. During the period of 1965 to 1977, approximately 1.8 billion pounds of TNT were produced.

In the 1972 Atlas Chemical Industries, the operating contractor, was purchased by ICI Americas Incorporated. ICI Americas, Inc.'s contract expired 31 Dec 1998. The plant is currently in inactive excess status and Tecumseh Professional Associates, Inc. is the new operating contractor.

The area now known as the CFI lease area was initially used by the Army for nitric and sulfuric acid production from 1942 to 1945 and from 1952 to 1957. In 1962 the CFI lease area was established when the Army leased that land to CF Industries, Inc. (CFI). CFI used the leased 824-acre site for the commercial production of ammonium nitrate fertilizer, urea, and related products. At the start of the Vietnam War in 1965, the Army reclaimed the use of all the existing acid production equipment in the CFI area to increase its nitric acid production and sulfuric acid concentration capacity.

Installation Information Continues Next Page

HISTORY & MISSION: continued

CFI constructed a new acid plant adjacent to the ammonia plant they had previously built for their commercial ammonium nitrate production, and simultaneously operated the old acid plants to produce nitric acid and concentrated sulfuric acid for VOAAP. Commercial production by CFI continued until 1982 when all operations were terminated for economic reasons. During 1985 and 1986 all of the CFI production areas were dismantled for salvage. CFI no longer leases the property. However, former Army acid production facilities were not dismantled until 1997.

On 01 November 1991, VOAAP received a notification of Environmental Protection Agency's (USEPA) intention to issue an Order and Agreement pursuant to Section 106 of CERCLA. After subsequent negotiations and correspondence between Army representatives and USEPA, USEPA Region IV decided not to issue the Order. USEPA Region IV has expressed interest in work being conducted at VOAAP; however, in a meeting on 20 February 1996 USEPA Region IV stated that because VOAAP would not likely be added to the NPL, they would leave remediation entirely to the State.

In March 1997 VOAAP was advised that the lead regulatory agency would be TDEC's Division of Superfund. Subsequently, the State began to review documents and provide constructive comments in an informal partnering spirit in the absence of an interagency agreement. VOAAP solicited interest in forming a Restoration Advisory Board (RAB) in September 1997. The public petitioned to form a RAB, and the first RAB meeting was held on 19 February 1998.

As mentioned earlier, the Army determined that VOAAP was excess to its needs in 1997. In Congress, legislation was passed to allow transfer approximately 975.95 acres to Hamilton County/City of Chattanooga. The General Services Administration (GSA), which is the disposal agency for the Army, is acting as the executing agency for all property transfer actions. Hamilton County and the City of Chattanooga bought 975.95 acres in September 2000 for $7.5 million via negotiated sale under early transfer authority. In 2001 the Army completed removal of contaminated soil on-site. As of 2002, all work under early transfer authority was completed and the CERCLA covenants were given by the Army. In April 2002, the property was removed from the notice of hazardous substance sites (removed from State Superfund) in the state of Tennessee.

In late 2000 TDEC consulted with USEPA Region IV on appropriate actions to encourage expedited cleanup of the site. It was determined that USEPA would issue an enforcement vehicle (3008 (h)) of RCRA to the Army. The Army received the final order on Dec. 4, 2001.

In 2003, ~262 acres along the southern boundary of VOAAP were transferred to the city of Chattanooga and Hamilton County. In 2004, 2,812 acres of VOAAP comprising the eastern portions of the facility were transferred to the National Park Service, the City of Chattanooga, and Hamilton County.

Contamination Assessment

OVERVIEW

The Installation Restoration Program (IRP) at VOAAP was initiated with the completion of the Installation Assessment of Volunteer Army Ammunition Plant (USATHAMA, 1978). Numerous additional investigations have been conducted and are listed in the Previous Studies section.

TNT-related contaminants have been found in soils, sediments, and groundwater at or near the TNT manufacturing and associated supporting facilities. Contaminants (As, Pb, PCBs, PAHs and explosives) have also been detected in soils near former processing facilities. Off-post ground water contamination has been observed in residential wells and springs north and south of the facilities. Studies of off-post groundwater contamination have been conducted concluding that only low-levels of explosives are present and that no immediate risk to human health or the environment is present. Certain residents were placed on the public water supply. Follow-on studies are underway.

The Site Investigation, Remedial Investigation and Feasibility Studies were performed on the installation as a whole, not by specific AEDB-R sites. This resulted in one Draft Site Investigation (SI) report, one Draft Remedial Investigation (RI) report, and one Draft Feasibility Study (FS) completed for the installation. The draft SI Report was submitted to both USEPA Region IV and the State of Tennessee for review and comment in December 1994. The draft RI Report was submitted for review in June 1995 and the draft FS was submitted in July 1997. TDEC's Superfund Division became the lead regulatory agency in 1997. When the RCRA 3008 (h) order became effective on Dec. 4, 2001, the USEPA became the lead agency.

Additional investigations including RFIs, RFAs, and Confirmatory Sampling events have since been conducted at all identified sites at VOAAP as required under the EPA 3008(h) order. Reporting for these investigations is underway.

Contamination Assessment

PREVIOUS STUDIES

1979

- U.S. Army Toxic and Hazardous Materials Agency (USATHAMA), Installation Assessment of Volunteer Army Ammunition Plant, Records Evaluation Report No. 123, 1979.
- U.S. Army Toxic and Hazardous Materials Agency (USATHAMA), A study of Landfill Leachates at Volunteer Army Ammunition Plant, 1979.

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- U.S. Army Toxic and Hazardous Materials Agency (USATHAMA), Environmental Contamination Survey of Volunteer Army Ammunition Plant: Confirmatory Phase, 1984.
- U.S. Army Toxic and Hazardous Materials Agency (USATHAMA), Contamination Survey of Volunteer Army Ammunition Plant, Chattanooga, Tennessee, Final Technical Report, 1984.
- USATHAMA - Historical Installation Assessment Volunteer Army Ammunition Plant (Aerial Photography) The Biometrics Corporation, TS-PIC-84001, December 1984.

1985

- U.S. Army Toxic and Hazardous Materials Agency (USATHAMA), Archives Search (Part I) and Limited Sampling and Analysis (Part II) at the CF Industries, Inc. Lease Area on Volunteer Army Ammunition Plant, 1985.
- Historic American Building Survey/Historic American Engineers Records, National Park Service Historic Properties Report Volunteer Army Ammunition Plant, August 1985.

1987

- U.S. Army Toxic and Hazardous Materials Agency (USATHAMA), RATTS - Volunteer Army Ammunition Plant Feasibility Study Draft Final Report, 1987.
- U.S. Army Toxic and Hazardous Materials Agency (USATHAMA), Final Draft Report of Remedial Investigations, Volunteer Army Ammunition Plant, 1987.

1989

- U.S. Army Toxic and Hazardous Materials Agency (USATHAMA), Public Involvement and Response Plan for Volunteer Army Ammunition Plant, January, 1989.

1990

- U.S. Army Toxic and Hazardous Materials Agency (USATHAMA), Remedial Investigation/Feasibility Study Volunteer Army Ammunition Plant, Addendum Follow-up Report, 1990.
- U.S. Army Toxic and Hazardous Materials Agency (USATHAMA), Remedial Investigation/Feasibility Study Addendum, Background Soil Study for the CF Industries, Inc., Volunteer Army Ammunition Plant, 1990.
- ICI Americas Incorporated, Historic Resource Survey of Volunteer Army Ammunition Plant, U.S. Army Corps of Engineers, Mobile District, January, 1990.
- U.S. Army Industrial Operations Command Environmental Baseline Survey, Volunteer Army Ammunition Plant. (Tecumseh) Professional Associates, Inc. Nov 12 1999. Vista Technologies (Vista) November, 1990.

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PREVIOUS STUDIES, continued

1991

- Letter, Tennessee Historical Commission Future Archaeological Surveys of the Volunteer Army Ammunition Plant Projects, January, 1991.
- Letter, Tennessee Historical Commission, Future SHPO Review of Volunteer Army Ammunition Plant Projects, January, 1991.

1992

- U.S. Army Toxic and Hazardous Materials Agency (USATHAMA), Residential Well Sampling at Volunteer Army Ammunition Plant, 1992.

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- U.S. Army Environmental Center, Quality Assurance Project Plan, Remedial Investigation/Feasibility Study and Site Investigation, Volunteer Army Ammunition Plant, 1993.
- U.S. Army Environmental Center, Interim Report: Preliminary Site Reconnaissance Activities, Volunteer Army Ammunition Plant, 1993.

1994

- U.S. Army Environmental Center, Technical and Sampling Plan for SI and RI/FS at Volunteer Army Ammunition Plant, Draft Addendum II, 1994.
- U.S. Army Environmental Center, Technical and Sampling Plan for SI and RI/FS at Volunteer Army Ammunition Plant, Draft Addendum I, 1994.
- U.S. Army Environmental Center, Technical and Sampling Plan for SI and RI/FS at Volunteer Army Ammunition Plant, 1994.
- ICI Americas, Inc., Closure/Post Closure Plan, Sanitary Landfill, Volunteer Army Ammunition Plant, 1994.
- U.S. Army Environmental Center, Site Investigation Report, Draft Volunteer Army Ammunition Plant, 1994.

1995

- U.S. Army Environmental Center, Remedial Investigation Report, Draft, Volunteer Army Ammunition Plant, 1995.

1997

- U.S. Army Environmental Center, Feasibility Study, Draft Final, Volunteer Army Ammunition Plant, 1997.
- U.S. Army Corps of Engineers, Mobile District, Closure Plan Explosive Waste Burning Unit, 1997.

1998

- ICI Americas, Inc., Remediation Plan, Explosive Waste Burning Unit, Volunteer Army Ammunition Plant, 1998.
- U.S. Army Corps of Engineers, Mobile District, Field Sampling Plan Addenda - Supplemental Site Investigations/ Remedial Investigations at Various Sites, 1998.
- Work Plan for Remediation Plan Facility Closure Explosive Waste Burning Unit/Burning Ground Area VAAP, Consolidated Technologies, Inc., May 1998.

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Contamination Assessment

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1998, *continued*

- Preliminary Hydrogeologic Report, Proposed Class I Landfill VAAP Site, Consolidated Technologies, Inc., June 1998.
- Groundwater Data Report, Consolidated Technologies, Inc., June 19, 1998.
- Environmental Baseline Survey VAAP Final Report, September 25, 1998.

1999

- Proposed Disposal, VAAP Final Environmental Impact Statement, Potomac-Hudson Engineering Inc, July 1999.
- GSA - Proposed Volunteer Army Ammunition Plant Final Environmental Impact Statement (FEIS) Potomac - Hudson Engineering, Inc., July 1999.
- Contract NO. GS09D-98-CFC-001, Tecumseh Professional Associates, Inc., November 12, 1999.
- Remediation Plan and Focused Remedial Design Vanadium Pentoxide Burial Ground Removal Action, IT Corp., December 1999.

2000

- Report of Findings for Supplemental Site Investigations at Various Sites, Volunteer Army Ammunition Plant, IT Corporation, February 2000.
- Residential Well Survey Letter Report for Areas South and West of Volunteer Army Ammunition Plant, Chattanooga, TN, IT Corporation, February 2000.
- Field Sampling Plan Addenda Supplemental Site Investigations Remedial Investigations Multiple Sites and Areas of Concern, IT Corp., March 2000.
- Technical Sampling Plan Addenda Supplemental Site Investigations Remedial Investigations Multiple Sites and Areas of Concern, IT Corp., March 2000.
- Installation Action Plan for VAAP, March 2000.
- Work Plan Addenda Supplemental Sampling at the Magazine Area, IT Corp., July 2000.
- Groundwater Sampling Results of the Twelve Quarterly Monitoring Wells First and Second Quarters Feb 2000 - April 2000, IT Corp., August 2000.

2001

- Report of Findings and Basis for a Soil Removal Action in the Western Magazine Area, IT Corp., March 2001.
- Draft Soil Removal Action Report for the Western Magazine Area, IT Corp., November 2001.
- Draft Annual Groundwater Sampling Report, TNT Manufacturing Valley (February, April, July, and October 2000), IT Corp., November 2001.
- Draft Annual Groundwater Sampling Report, Western Magazine Area (November 2000 and March, April, August 2001), IT Corp., November 2001.
- Draft Supplemental Site Investigation Results/Confirmatory Sampling at Various Areas of Concern, IT Corp., December 2001.
- Draft Site Investigations/Confirmatory Sampling at Various Redwater Ash Handling and Disposal Area, IT Corp., December 2001.

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PREVIOUS STUDIES, continued

2002

- Draft Interim Corrective Measures for the Soil Removal Action at the Vanadium Pentoxide Area IT Corp., March 2002.
- Phase I Environmental Site Assessment and Phase II Site Investigation, Railroad Network Easement, Potomac-Hudson Engineering, Inc., April 2002.
- Final RCRA Facility Assessment Report, Areas of Concern 9,10,10b, and Salvage Yard, IT Corp., June 2002.
- Final Installation Quality Assurance Project Plan For Environmental Investigating and Corrective Measures, IT Corp., July 2002.
- Draft RCRA Facility Assessment Report, Redwater Ash Handling and Disposal Areas and Miscellaneous Areas of Concern, IT Corporation, July, 2002.
- Draft Installation-wide Human Health and Ecological Risk Assessment ,Volumes 1 and 2, IT Corp., July 2002.
- Public Participation Plan Update, IT Corp., September 2002.
- Interim Measures Work Plan, Area of Concern #2 - Pistol Ranges, World Environmental, Inc., Sept 2002.
- Confirmatory Sampling Work Plan, Redwater Ash/Gypsum Sludge Landfill, SWMU-5, IT Corp., October 2002.
- Final Environmental Assessment in Support Of Clean Parcel Determination for the 200-acre and 85-acre Parcels along The Southern Boundary, IT Corp., November 2002.
- Final Groundwater Sampling Report, March 2000 through August 2002, Western Magazine Area – 940 Acre Parcel, IT Corporation, November 2002.

2003

- Warehouse Area RFA Work Plan 9-Jul-02 (Draft), 9-Jan-03 (Complete); Tetra Tech/MACTEC.
- Draft Technical Memorandum, Documentation of Closure of Underground Storage Tanks at the Old Gas Station, Former Building 724, Shaw Environmental, Inc., February 2003.
- Draft Technical Memorandum, Summary of Investigation Activities at the Final Settling Pond, Shaw Environmental, Inc., March 2003.
- Final Confirmatory Sampling Report for the Eastern Magazine Area and Surrounding Property, Shaw Environmental, Inc., July 2003.
- World War II Burning Ground RFI Work Plan Draft-final submitted February 2003 (Complete, approved by USEPA on August 13, 2003); Tetra Tech/MACTEC.
- Redwater Ash Disposal & Handling Area, Misc. Disposal RFA Report submitted on 2/1/03 (Comments received from USEPA on August 27 2003); Tetra Tech/MACTEC.
- Redwater Ash Disposal & Handling Area, Misc. Disposal RFI Work Plan - On-Hold; Tetra Tech/MACTEC.
- Summary of Interim Measures, Area of Concern #2 - Pistol Ranges, World Environmental, Inc., May 6, 2003.
- Site Wide Groundwater Investigation Phase I RFI Work Plan, Phase I Draft RFI Submitted on July 15, 2003 (Complete, work plan approved by USEPA on August 27, 2003); Tetra Tech/MACTEC.
- New Landfill/Burning Ground Area RFI/CMS Report 1-Jul-02 (Complete, final RFI CMS approved by USEPA on 8/12/03); Tetra Tech/MACTEC.

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PREVIOUS STUDIES, continued

2003, *continued*

- World War II Landfill Area RFI Work Plan, Draft-final submitted February 2003, Complete, approved by USEPA on August 13, 2003; Tetra Tech/MACTEC.
- Industrial Landfill (aka Construction Debris Disposal) Area RFI Work Plan, Draft-final submitted February 2003, Complete, approved by USEPA on August 13, 2003; Tetra Tech/MACTEC.
- Phase II Environmental Site Assessment, Field Sampling Plan - Final, Plexus Scientific Corp., September 2003.
- CFI Lease Area RFA Report, RFA Text, table and CAD files provided to Shaw on 10/7/03, Complete, to be included in RFI/CMS report, text, figures and tables submitted to Shaw on 9/3/03; Tetra Tech/MACTEC.
- Salvage Yard RFI Work Plan, draft submitted on 1-Dec-02, Complete, final work plan approved by USEPA on August 27, 2003; Tetra Tech/MACTEC.
- New Acid Area RFI Work Plan Draft-final submitted February 2003 (Revised Appendix A sent out with NAA buildings and history 9/17/03 - Document Complete); Tetra Tech/MACTEC.
- East Acid Area RFI Work Plan East Acid Area RFI text, tables, and CAD files provided to Shaw the week of September 15, 2003; Tetra Tech/MACTEC.
- Final Burn Cage Removal Action Report, New Landfill/Burning Ground Area, Shaw Environmental, Inc., September 2003.
- Final Interim Corrective Measures Report for the Soil Removal Action at the Vanadium Pentoxide Burial Ground, Shaw Environmental, Inc., October 2003.
- Draft Interim Corrective Measure Work Plan for the Railcar Loading Building 908-4, Shaw Environmental, Inc., October 2003.
- Draft RCRA Facility Investigation Report/Corrective Measures Study, East Acid Area, Tetra Tech, Inc./Shaw Environmental, Inc., October 2003.
- Final Installation-Wide Quality Assurance Project Plan for Environmental Investigations and Corrective Measures, Revision 1, Shaw Environmental, Inc., October 2003.
- Draft RCRA Facility Assessment/RCRA Facility Investigation Report, CFI Lease Area, Shaw Environmental, Inc., October 2003.
- Draft Technical Approach, Evaluation to Railroad Tenants of Exposure to Possible Contamination Along the Rail System, Shaw Environmental, Inc., October 2003.
- Draft Site Wide Groundwater Investigation Phase II RFI Work Plan 22-Oct-03; Tetra Tech/MACTEC.
- ICM Work Plan for AOC 4, AOC 10b, and AOC 11, Document submitted on 10/07/03, Decision was made to prepare an ICM work plan and lump the Redwater Ash Handling Area, AOC 4, and AOC 10b together; Tetra Tech/MACTEC.
- Warehouse Area including Pesticide Storage Area RFA Report, draft document submitted on 8-Jul-03, Comments received from USEPA on August 27 2003, Final document resubmitted on 10/16/03, Complete; Tetra Tech/MACTEC.
- Draft Phase I RCRA Facility Investigation Report for the Installation-Wide Groundwater Investigation, November 2003, Tetra Tech/MACTEC.

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2004

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- Site-wide Groundwater Investigation Area, Phase II CMS Work Plan, Final, January 2004, TetraTech/ MACTEC.
- Railcar Loading Area and Old Explosives Magazine Area, Interim Corrective Measure Work Plan, Final, February 2004, Shaw Environmental, Inc.
- Site-wide Groundwater Investigation Area, RCRA Facility Investigation Report, Draft, March 2004, Shaw Environmental, Inc.
- Tenant Risk Evaluation, Rail Tenants, Final, April 2004, Shaw Environmental, Inc.
- Warehouse Area, Confirmatory Sampling Work Plan, Final, April 2004, Shaw Environmental, Inc.
- CFI Lease Area, Interim Corrective Measures Work Plan, Final, April 2004, Shaw Environmental, Inc.
- CFI Lease Area, RCRA Facility Assessment/RCRA Facility Investigation Report, Final, May 2004, TetraTech/ MACTEC & Shaw Environmental, Inc.
- East Acid Area, RCRA Facility Investigation/Corrective Measure Study Report, Final, June 2004, TetraTech/ MACTEC & Shaw Environmental, Inc.
- East Acid Area, Statement of Basis, Draft, June 2004, Shaw Environmental, Inc.
- Salvage Yard, RCRA Facility Investigation Report, Draft, July 2004, Shaw Environmental, Inc.
- AOC-4, AOC-10b, and Redwater Ash Handling Area, RCRA Facility Assessment/Interim Corrective Measure Report, Draft, August 2004, Shaw Environmental, Inc.
- New Acid Area, RCRA Facility Investigation Report, Final, September 2004, Shaw Environmental, Inc.
- World War II Burning Ground, RCRA Facility Investigation Report, Final, September 2004, Shaw Environmental, Inc.
- Railcar Loading Area and Old Explosives Magazine Area Corrective Measure Study/Interim Corrective Measure Report, Final, September 2004, Shaw Environmental, Inc.
- Old & New TNT Areas and Redwater Treatment Plant Area, RCRA Facility Investigation/ Corrective Measure Study Report, Final, September 2004, Shaw Environmental, Inc.
- Pistol Ranges, Final RCRA Facility Investigation/Interim Corrective Measure Report, September 2004, World Environmental, Inc.
- Construction Debris Disposal Area, RCRA Facility Investigation Report, Final, October 2004, Shaw Environmental, Inc.
- World War II Landfill Area, RCRA Facility Investigation Report, Final, October 2004, Shaw Environmental, Inc.

2005 IAP

Volunteer ER,A Site Descriptions

OLD EAST ACID AREA (AOC 1)
VAAP-01

SITE DESCRIPTION

The VAAP-01 site encompasses approximately 18 acres east of the central TNT production facilities on the western half of VOAAP. The East Acid Area was operated intermittently during the various periods of production from 1941 to 1970. The area consisted of nitric and sulfuric acid production facilities, an oleum (concentrated sulfuric acid) production facility, and an ammonia storage facility. Except for a number of aboveground storage tanks (fuel oil and toluene), the production facilities were disassembled, decontaminated, and sold in 1974.

A CS was performed in 1994 and RFI in 1995. The results of the CS and RFI indicated that a remedial action was necessary; therefore, a draft CMS was developed. Subsequent to the review of the draft CMS, it was determined that further delineation of the extent of contamination would be required before a final CMS could be completed. To fill data gaps from the draft CMS, supplemental sampling was completed in 1999. Results indicate contamination in soil and sediments surrounding the former production buildings is more widespread than originally believed. The vertical extent of soil contamination above proposed preliminary remediation goals (PRGs) is limited to the upper 10 feet.

STATUS

RRSE RATING: High

CONTAMINANTS:
Explosives, PCBs, As, Pb, PAHs

MEDIA OF CONCERN:
Soil, Groundwater, Sediment

COMPLETED IRP PHASE:
RFA, CS, RFI/CMS

CURRENT IRP PHASE: DES

FUTURE IRP PHASE: CMI(C)

PROPOSED PLAN

In order to meet the requirements of the RCRA order, the RFI/CMS is being finalized. This report documents the characterization of the site and the selected soil and sediment remedial alternative. The CMS estimates that 1,549 cy of explosives-impacted soils, 607 cy of arsenic-impacted soils, 13,000 cy of lead-impacted soils, and 2,656 cy of PCB-impacted soils will require remedial action.

Any groundwater contamination and LTM will be addressed under VAAP-35.

CFI LEASE AREA (SWMU 7)
VAAP-02

SITE DESCRIPTION

The CFI Lease Area site consists of approximately 686 acres located along the western boundary of VOAAP. Of these 686 acres, only approximately 56 acres correspond to the actual production facilities. The area contains a number of former plant facilities for the production, handling, and storage of nitric acid, ammonium nitrate, and urea, as well as sulfuric acid concentration facilities. In addition, former urea and fertilizer manufacturing facilities were located at this site. A CS was performed in 1994 and RFI in 1995. The results of the CS and RFI indicated that a remedial action was necessary; therefore, a CMS was developed. Subsequent to the review of the draft CMS, it was determined that further delineation of the extent of contamination would be required before a final CMS could be completed. The supplemental sampling was completed in 1999. Results indicate contamination in soil surrounding the former production buildings is more widespread than originally believed. The vertical extent of soil contamination above proposed preliminary remediation goals (PRGs) is limited to the upper 10 feet. An EBS performed in 2003 revealed the presence of a toluene distribution network, including a pipeline extending the length of the area from north to south to the toluene tanks. Portions of this pipeline have been evaluated, but additional investigation will be required of the toluene distribution system to determine if there were leaks. The draft RFI was prepared to document the nature and extent of contamination at the site, and included a RFA for the non-production areas. The final RFA/RFI was submitted in mid-2004.

A Phase II Environmental Site Assessment (ESA) was conducted in late 2003 which included investigations of two smaller AOCs within the CFI Lease Area. These sites were identified in the 1984 EPIC study as Site 4 and Site 9. EPIC Site 4 includes a possible redwater ash disposal area, several possible pits, and debris piles; EPIC Site 9 contains two potential fill areas, two debris areas, and three pits and two mounded areas that were to be assessed in the ESA.

Site Description continued on next page

STATUS

RRSE RATING: High

CONTAMINANTS:
PCBs, As, Pb, PAHs

MEDIA OF CONCERN:
Groundwater, Soil, Sediment

COMPLETED IRP PHASE: RFA, CS, RFI

CURRENT IRP PHASE: ICM (Funded), CMI(C) (Funded)

FUTURE IRP PHASE: CMI(C)

CFI LEASE AREA (SWMU 7), *continued*
VAAP-02

PROPOSED PLAN

The Final Interim Corrective Measures Work Plan for removal of contamination associated with the industrial area was approved on June 9, 2004. As part of the interim action, it is anticipated that metals-impacted soils will be excavated, stabilized onsite and then disposed of offsite. Other contaminated soils (cPAHs and PCBs) will be disposed of offsite in conjunction with the stabilized metals-impacted soils. Approximate volume of soils to be removed is 15,382 cy. Although it is anticipated that the ICM will be the final action, the Army may conduct additional actions if required.

Because of their extent, the toluene pipeline, dock area, and associated toluene tanks will be administratively removed from the CFI Lease Area and assessed separately from VAAP-02. The toluene distribution system will be defined as a new AEDB-R site, and will include areas outside of the CFI Lease Area.

Any groundwater contamination and LTM will be addressed under VAAP-35.

PISTOL RANGE (AOC 2)
VAAP-03

SITE DESCRIPTION

Site VAAP-03 consists of two closed pistol ranges (used until 1995) for training by the VOAAP security guards. The ranges are located in the northern portion of the installation. A focused CS was accomplished in December 1998 and results indicated high levels of lead in soil and lead slugs on the surface. Further delineation and an ICM were completed in 2003. The draft ICM report was submitted in 2003; the final RFI/ ICM report is scheduled for submittal in April 2004. The ICM / remedial action contract has been managed by OSC. The pistol ranges have been removed and site restoration will be complete upon regulatory acceptance of the final ICM report.

This site is not eligible for IRP funding and is being remediated with OMA funds.

STATUS

RRSE RATING: NE

CONTAMINANTS: Lead

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE: RFA, CS, RFI

CURRENT IRP PHASE: RC

RC DATE: 198403

ENVIRONMENTAL LAB
VAAP-04

SITE DESCRIPTION

Site VAAP-04 is a former environmental laboratory used to perform water quality analyses. A focused SI was performed in January 1999 and results indicate no contamination present.

USEPA and TDEC concurred in July 01 that no further action is necessary.

STATUS

RRSE RATING: NE

CONTAMINANTS: Metals, VOCs

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE: RFA, CS, RFI

CURRENT IRP PHASE: RC

RC DATE: 198403

OLD STORAGE AREA (EXP MAG) (AOC 7)
VAAP-05

SITE DESCRIPTION

Site VAAP-05 consists of the western-most of the two magazine areas located in the eastern half of the installation. The site previously contained 100 igloo-type magazines for storage of final TNT product. Explosives are no longer stored at VOAAP.

A portion of this site was the 975.95 acres sold to Hamilton County and the City of Chattanooga for $7.5 million via negotiated sale under early transfer authority in September 2000. Supplemental investigations were conducted and contaminants were discovered in soil/sediment and groundwater. A removal action of contaminated soils within the conveyed property was completed in September 2001. The storage magazines were subsequently demolished by Hamilton County. Groundwater sampling continued until 2002 and the results indicated that no further action was required. The site has been removed from the TN Superfund list; the site was not part of the RCRA Order.

STATUS

RRSE RATING: High

CONTAMINANTS: Explosives

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE: RFA, CS, RFI, DES

CURRENT IRP PHASE: ICM (funded), CMI (funded)

FUTURE IRP PHASE: RC

RC DATE: 200409

One small area (approximately 300 ft^2) near the railcar loading area required explosives remediation. Removal was implemented to the degree feasible in 2001, but additional TNT contaminated soil remained in place below the building. Therefore, an additional removal action was completed in March 2004, which included razing of Building 908-4 and excavation and off-site disposal of impacted soils. Results of the confirmation sampling, conducted after the removal action, as presented in the CMS/ICM Report, indicated that the contamination had been removed. Upon regulatory approval of the removal action, this additional area will be RC.

NEW STORAGE AREA (EXP MAG)
VAAP-06

SITE DESCRIPTION

Site VAAP-06 is the easternmost portion of the two large magazine areas, located in the eastern half of the installation. The site contains 100 Corbetta type magazines for storage of final TNT packaged product. Explosives are no longer stored at VOAAP.

A focused SI was performed in January 1999 and results indicated no contamination present. These results were conveyed in a report of findings which requested no further action for this site. Additional sampling has been conducted by TDEC. In addition, the Commander's Garden (AOC 10) was identified and a RFA report submitted in April 2002. A RFA report was prepared for the Gray Pond in July 2002 and the site was considered response complete in August 2002.

STATUS

RRSE RATING: Low

CONTAMINANTS: Explosives

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE: RFA, CS

CURRENT IRP PHASE: RC

RC DATE: 200310

A confirmatory sampling event was completed in 2003 with sampling of each magazine and drainage ways in the area. The final CS report recommending No Further Action for soil, drainage ways, and groundwater was approved by USEPA and TDEC in August 2003 along with the approval of NFA for AOC 10. Therefore, the Eastern Magazine Area, Gray Pond and Commander's Garden are response complete.

BURNING GROUND / NEW LF (SWMU 9)
VAAP-15

SITE DESCRIPTION

Site VAAP-15 encompasses approximately 80 acres, including a 0.6 acre burning pad, a 225 ft^2 flash pad, a 400 ft^2 burn cage, and a 3.2 acre unlined landfill. The site is located north of the New Magazine Area, in the eastern half of the installation. RCRA closure of the landfill occurred in April 1996. Groundwater is being monitored.

TDEC issued a clean RCRA closure in May 1999 for the burn pad.

A CMS was completed for VAAP-15 in July 2003. In addition, a removal action for soil contaminated with lead and TNT at the burn cage was also completed in July 2003. Following supplemental sampling at several areas within VAAP-15, completion of the CMS, and the removal action, a No Further Action was concurred with by TDEC and USEPA in August 2003.

STATUS

RRSE RATING: Medium

CONTAMINANTS: Explosives

MEDIA OF CONCERN: Soil, Groundwater

COMPLETED IRP PHASE: RFA, CS, RFI, CMS

CURRENT IRP PHASE: RC

RC DATE: 200308

BURNING GROUND (WWII) (SWMU 4)
VAAP-16

SITE DESCRIPTION

Site VAAP-16 is located on approximately 2.5 acres south of the Old East Acid Area between the TNT production facilities and the Old Magazine Area. The site was used from 1941 until the early 1960s to burn explosives-contaminated material in an open, unlined pit.

A focused CS was accomplished in 1994 and results indicated low levels of explosives and organics. A RFI was conducted in 2003, which indicated PRG exceedances in some isolated soil and sediment samples. USEPA and TDEC requested that an exposure area risk evaluation for the soil contaminants that were detected above PRGs be prepared and included in the RFI report, was submitted in April 2004. The Risk Evaluation shows that there is no unacceptable risk for soils and sediment. However, based on results of previous studies and preliminary results of samples collected during the RFI, it is assumed that no further action will be required for site soils.

Groundwater samples from three wells also contained concentrations of explosives slightly above their respective PRGs, but the explosives concentrations in groundwater appear to be declining over time based upon a comparison of 2003 data to earlier data from 1994 and 2001. It has been shown that the WWII landfill is the source of GW contamination at this site.

STATUS

RRSE RATING: Medium

CONTAMINANTS:
Explosives, PAHs, Metals

MEDIA OF CONCERN:
Soil, Sediment, Groundwater

COMPLETED IRP PHASE:
RFA, CS, RFI, DES, CMI

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

PROPOSED PLAN

Land Use Control and LTM will be required for groundwater beneath the site, however these will be funded under VAAP-21 and 35. This remedy will close VAAP-16 (SWMU #4).

VANADIUM PENTOXIDE / ASBESTOS BURIAL GRND (SWMU 3) VAAP-18

SITE DESCRIPTION

Site VAAP-18 is located east of the new TNT production facilities and consists of two acres containing two marked, unlined burial areas. The first of these areas contained approximately 70,000 pounds of vanadium pentoxide buried in drums.

Remedial action for the vanadium pentoxide area was completed in 1999 - 2000. A draft removal action report documenting removal and nature and extent of any remaining contamination was completed in April 2002. The removal action report was finalized and approved in December 2003. The vanadium pentoxide area of VAAP-18 is response complete.

The second area contains approximately 107 tons of double-bagged asbestos pipe insulation. The burial of asbestos at the burial ground was previously approved by the State of Tennessee.

Groundwater sampling was performed in 1994 and 2000.

STATUS

RRSE RATING: Low

CONTAMINANTS:
Vanadium Pentoxide

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA, CS, RFI/CMS

CURRENT IRP PHASE: LTM

FUTURE IRP PHASE: LTM

PROPOSED PLAN

As currently envisioned, a deed restriction and land-use controls will be required for the asbestos burial ground. However, in light of property transfer considerations, it has been suggested that the asbestos be removed from the burial ground and disposed of in an off-site landfill, thereby eliminating the need for land use controls for VAAP-18. In response to requests from the USEPA and TDEC, the cost-benefit for both options (remain in place with LUC versus removal) will be evaluated including long-term maintenance of the burial ground before a final decision is made.

CONSTRUCTION DEBRIS DISPOSAL AREA (SWMU 1)
VAAP-20

SITE DESCRIPTION

Site VAAP-20 is located approximately 800 feet east of the Old East Acid Area in an undeveloped part of VOAAP. The site consists of a three-acre unlined disposal area for decontaminated industrial waste and construction debris. The disposal area was in operation from the 1970s to 2000. Surface debris was removed in 2002.

A RFI was conducted in late 2003, and included sampling and site trenching. The RFI identified contaminants in surface and subsurface soils; constituents were detected at up to 24 feet bgs, but PRGs were not exceeded below 14 feet bgs. Contaminants were not detected above PRGs in the leachate sample collected from one of the trenches. This site does not appear to be a source of groundwater contamination.

STATUS

RRSE RATING: Medium

CONTAMINANTS: PAHs, PCBs, VOCs, Explosives, Metals, Pentachlorophenol

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE: RFA, CS

CURRENT IRP PHASE: RFI/CMS

FUTURE IRP PHASE: DES, CMI(C), LTM

PROPOSED PLAN

The draft RFI Report was submitted in May 2004 to USEPA and TDEC. A draft CMS Work Plan was also developed and submitted in August 2004. Pending further RFI and CMS results, it is anticipated that site remediation will be necessary.

LANDFILL (WWII) (SWMU 2)
VAAP-21

SITE DESCRIPTION

Site VAAP-21 is located in the west-central portion of VOAAP. The site comprises approximately 20 acres and consists of an unlined landfill that operated between 1941 and the late 1960s. The landfill and disposal trenches reportedly received redwater ash, redwater sludge and refuse.

A focused CS was accomplished in 1994 and results indicated low levels of explosives and organics in groundwater. Investigative trenching was completed in September 00. Soil contaminants were detected.

A RFI, including sampling and trenching, was completed in December 2003. The RFI indicates the presence of contaminants in surface and subsurface soils, above PRGs in some locations. Explosives were detected in one leachate sample collected from one of the waste disposal trenches as well as in groundwater samples. Based upon the discrete, parallel burial trenches filled with waste that were observed during the RFI, the WWII landfill appears to be composed primarily of these trenches.

STATUS

RRSE RATING: Medium

CONTAMINANTS: Lead, Explosives, PAHs, PCBs

MEDIA OF CONCERN: Soil, Groundwater

COMPLETED IRP PHASE: RFA, CS

CURRENT IRP PHASE: RFI, CMS

FUTURE IRP PHASE: DES, CMI(C), LTM

PROPOSED PLAN

The RFI results suggest that materials disposed of in the landfill/disposal trenches may be a source of groundwater contamination at the site. The Draft RFI Report has been submitted to USEPA and TDEC. The CMS work plan is also being developed to explore the site remedial action alternatives and associated costs.

Any groundwater contamination and LTM will be addressed under VAAP-35.

MAGAZINE AREA RWA - GS LANDFILL (SWMU 5)
VAAP-23

SITE DESCRIPTION

Site VAAP-23 is located in the east-central portion of VOAAP within the New Magazine area. Redwater ash and gypsum sludge were disposed over this three-acre site. A marshy area is located at the southern end of the disposal area. This standing water eventually drains to the southeast, where it leaves this site.

The unlined disposal area is believed to be located in a sinkhole. A focused CS was accomplished in 1994 and results indicated the presence of PAHs and metals.

A confirmatory sampling even for soil, surface water/sediment, and groundwater was conducted in 2003. The Final CS Report recommending No Further Action for all media was approved by USEPA and TDEC in August 2003.

STATUS

RRSE RATING: Low

CONTAMINANTS:
Explosives, Metals, PAHs

MEDIA OF CONCERN:
Groundwater, Soil

COMPLETED IRP PHASE:
RFA, CS, RFI

CURRENT IRP PHASE: RC

RC DATE: 200307

MUSTARD AGENT SPILL (1947, CLEANED)
VAAP-30

SITE DESCRIPTION

In 1946 a freight car en route to Redstone Arsenal was diverted to VOAAP where it was discovered that vapors of German Mustard Agent were leaking from several drums. The car was stopped at a railroad storage track adjacent to VOAAP and a team from the Technical Escort Unit (Redstone Arsenal) decontaminated its cargo. Some spillage on the ground was reported, but was fully decontaminated. After the leaking drums were decontaminated, the car was sealed and shipped to Redstone Arsenal. No residues from the operation were reported buried at VOAAP. No contamination was identified during the PA/SI and no further remedial action is proposed at this site.

TDEC has granted no further action status. USEPA concurred with TDEC and Army on this status. (TDEC letter dated 1/6/2000).

STATUS

RRSE RATING: NE

CONTAMINANTS: N/A

MEDIA OF CONCERN: N/A

COMPLETED IRP PHASE:
RFA, CS

CURRENT IRP PHASE: RC

RC DATE: 198403

WAREHOUSE AND PESTICIDE STORAGE
VAAP-31

SITE DESCRIPTION

The warehouse area of this site included a laundry facility, millwright shop, change houses, etc. Concerns were expressed by the USEPA that the area is contaminated with TNT and DNT. Hazardous material and hazardous waste may have been stored in the warehouse area.

The former laundry facility was later used as a pesticide mixing and storage building. The building was demolished in 1996. A focused CS was performed in 1999 and results indicated that no contamination was present in site soils at the pesticide mixing and storage building.

A RFA for the entire Warehouse Area was conducted in 2003; the final RFA Report was issued in October 2003. In response to the findings of the RFA, additional work is required at the Warehouse and Pesticide Mixing and Storage Area to assess potential releases.

STATUS

RRSE RATING: Low

CONTAMINANTS: Pesticides

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE: RFA

CURRENT IRP PHASE: RFI

FUTURE IRP PHASE: CMS, DES, CMI(C)

Several of the other buildings within the Warehouse Area have been razed, including Buildings 512-1 (Railroad Scale House), 701 (Locomotive Shop), 702 (Oil Storehouse), 703 (Paint Storehouse), 705 (Tool House/Labor Office), 706 (Gas Station and Garage/Electric and Scale Shops), 708 (Warehouse), 709 (Laundry/Pesticide Storage), 711-1 through 711-6 (Change Houses), 712 (Cafeteria/Storage), 714 (Maintenance Office/Lumber Shed), 717 (Railroad Car Shed), 718 (Heavy Equipment Shop/Automotive Garage), 719 (Unknown - Heavy Equipment Shop), 723 (Transportation Office), 727 (Oil Reclamation), 730 (Paint Shop), 750 (Paint Storage), 759 (Electric Storage), 814-A (Boiler Room), and several smaller storage sheds.

A Confirmatory Sampling event was conducted at VAAP-31 in May 2004, and included the Warehouse Area, the Pesticide Storage and Mixing Area, and the Old Gas Station/Maintenance Area. Results for the Warehouse Area/ Pesticide Storage Area are being evaluated; the investigation results for the Old Gas Station/Maintenance Area supported a No Further Action determination for that facility.

PROPOSED PLAN

The CS will be followed by a RFI if results warrant additional study.

TNT MFG VALLEY / INCL RDWTR TREATMENT PLT (AOC 3, 4, 9, 10, 10B) VAAP-32

SITE DESCRIPTION

Site VAAP-32 includes the old and new TNT production facilities, Salvage Yard, Redwater Treatment Plant, and the Industrial Surface Water Pollution Control Facilities (former site VAAP-34). The site originally consisted of 16 TNT production batch process lines built in 1942 in support of WWII. Today, only the foundations of the old batch process lines and buildings of six new continuous process lines, which were constructed between 1971 and 1975, are present at the site. Decontamination of the former Red Water Treatment Plant, located at the northern perimeter of VAAP-32, was completed by burning in February 2004; demolition of the remaining equipment was completed thereafter.

Limited disposal occurred at the site. Contamination is suspected to be primarily the result of spills during production of TNT in the old batch line area. Groundwater contamination is complicated by the presence of karst geology and was there for separated and covered as part of VOAAP 35.

STATUS

RRSE RATING: High

CONTAMINANTS:
Explosives, Lead, PCBs, PAHs, Arsenic

MEDIA OF CONCERN:
Soil, Groundwater, Sediment

COMPLETED IRP PHASE:
RFA, RFI, CMS

CURRENT IRP PHASE: DES

FUTURE IRP PHASE: CMI(C)

Initial RFI results indicated high levels of explosives in soil, sediment and groundwater. Additional contaminants include arsenic, lead, PCBs and PAHs.

A Draft RFI, Draft risk assessment and Draft CMS were previously completed. As a result of these efforts, new areas of concern were discovered, including the Redwater Ash Disposal & Handling Areas, AOC 9, AOC 10B, Salvage Yard and other miscellaneous areas of concern. Sampling was completed at these areas in 2000. The RFA for AOC 9, AOC-10, AOC 10b, and the Salvage Yard was completed in June 2002. AOC 9 and AOC 10 required no further action and are response complete. AOC-10b, a.k.a. the Figure 8 Area, required an ICM which was conducted in early 2004. During the interim measure additional material was discovered and is currently being assessed. For the Salvage Yard, a limited removal action will be required.

Site Description continued on next page

TNT MFG VALLEY / INCL RDWTR TREATMENT PLT, *continued*
VAAP-32

PROPOSED PLAN

The Statement of Basis for TNT Manufacturing Valley is scheduled for completion in FY 2005. Based on previous studies, it is anticipated that the Statement of Basis will propose that remediation of TNT-contaminated soil will be required for the TNT Manufacturing Valley. Treatability studies will be performed to evaluate remedial options for both shallow and deep (> 10 ft bgs) contaminated soil within the TNT manufacturing valley. Treatability will consider multiple technologies, as well as consideration of the interrelationship of groundwater and soil.

The ICM conducted at AOC 10b identified additional debris unrelated to the areas addressed under the ICM. As a result, this site will likely require additional work under a RFI and potentially a CMS.

The Draft RFI Report for the Salvage Yard was submitted to USEPA and TDEC in July 2004. Once the RFI is completed, it is anticipated that the Salvage Yard will require remedial action to remove lead contamination. The results of the remedial action will allow a no further action decision in the RFI report.

Groundwater contamination and LTM will be addressed under VAAP-35.

NEW ACID AREA (SWMU 6)
VAAP-33

SITE DESCRIPTION

Site VAAP-33 encompasses approximately 50 acres located north of the Old East Acid Area. The production area was only 18 acres. The site consists of acid production facilities constructed between 1969 and 1973 to support the new TNT production lines. The new acid production facilities were constructed on top of a former burning ground and a redwater ash disposal site, which were located at or near sinkholes. The area was filled to allow for the construction of the new acid facility. Thus, the former burning ground and disposal site are now some 20 to 30 feet below ground level. The relatively short period of acid production onsite is not expected to have caused a severe environmental impact. Groundwater contamination is complicated by the presence of karst geology.

STATUS

RRSE RATING: High

CONTAMINANTS:
Explosives, Metals, PCBs

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA, RFI/CMS

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

A limited soil CS was performed in 1999 and results indicated arsenic concentrations above the PRGs. Results are documented in a report of findings issued in 2000. A RFI was completed in December 2003, and the draft RFI Report was submitted in May 2004. USEPA and TDEC requested that an exposure area risk evaluation for the soil contaminants that were detected above PRGs be prepared and included in the RFI Report. Preliminary results of the RFI indicate that surface soils exhibit limited impacts from lead and PAHs. The Risk Evaluation shows that there is no unacceptable risk for soils and sediment. However, based on results of previous studies and preliminary results of samples collected during the RFI, it is assumed that no further action will be required for site soils.

Subsurface soils in a debris pile to the west of the New Acid Area contained metals and PCB concentrations above PRGs. Deep subsurface soils (~ 20 ft bgs) from the area of the former burning ground show low levels of TNT and PAHs. No contaminants were detected above PRGs for surface water or sediment. Explosives concentrations in several monitoring wells exceeded PRGs.

The identified debris pile contains approximately 10,000 cy of PCB and lead impacted materials; this pile will be removed from VAAP-33 and addressed separately.

Any groundwater contamination and LTM will be addressed under VAAP-35.

WW TREATMENT PONDS 4, 5, +COE
VAAP-34

SITE DESCRIPTION

Site VAAP-34 consists of the drainage ditches, equalization ponds and related facilities that drain some of the major suspected contamination source areas (i.e., Old Acid Area, CFI Lease Area, TNT Manufacturing Valley, and New Acid Area) into Waconda Bay, north of VOAAP. The drainage system may have acted as a significant contamination migration pathway for surface water contamination and sediments deposited in the ditches and ponds and may also have served as a contamination source to groundwater.

Further action at this site will be addressed under VAAP-32. This site is Response Complete in AEDB-R.

STATUS

RRSE RATING: Medium

CONTAMINANT:
Explosives, Metals, PAHs, PCBs

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA, CS

CURRENT IRP PHASE: RC

RC DATE: 198403

GROUNDWATER (AOC 6)
VAAP-35

SITE DESCRIPTION

VAAP-35 includes groundwater issues at the following AEDB-R sites: VAAP-01, 02, 16, 18, 20, 21, 31, 32, 33, 34. This site addresses all groundwater treatment systems as well as installation-wide long-term monitoring. Defining the extent of groundwater contamination at VOAPP is difficult due to the karst geology. Off-site migration of contaminants north and south of the TNT Valley has been confirmed. Explosives concentrations have been found in on-post wells several orders of magnitude above those seen in off-post wells and springs. These concentrations detected in some of the off-post wells are above regulatory guidelines.

STATUS

RRSE RATING: High

CONTAMINANT: Explosives, Arsenic, Lead

MEDIA OF CONCERN: Groundwater

COMPLETED IRP PHASE: RFA

CURRENT IRP PHASE: RFI/CMS

FUTURE IRP PHASE: CMS, DES, CMI(C), LTM

As part of a comprehensive GW RFI, 32 additional wells were installed in 2003 in the CDDA, NAA, EAA, WWII BG, and WWII LF. Groundwater RFI activities were completed in 2003. The supplemental wells were primarily installed to determine the lateral extend of groundwater contamination between specific sites to support the individual RFI's being conducted at the CDDA, NAA, EAA, WWII BG, and WWII LF and to support the subsequent mass flux and monitored natural attenuation study to be conducted during the CMS. The Phase I GW RFI Report was submitted in November 2003 to document the Phase I RFI activities; an installation-wide groundwater RFI Report was issued in March 2004.

The Army is also evaluating interim measures to control or address the offsite migration of contaminated GW and to address data needs for determining future corrective measures. Groundwater CMS work plan was finalized in January 2004. Field work included the installation of 53 additional wells to aid in the monitored natural attenuation and mass flux analysis and the collection of over 200 groundwater samples from on and off post monitoring wells and off post springs. Data collection included analysis for constituents of potential concern and key indicator parameters to facilitate selection of a groundwater remedy. A bench-scale treatability study is currently underway to evaluate various treatment technologies for deep soil contaminated with explosives. Bench-scale leachability studies are also being performed to determine if explosives contaminated soils may be a continuing source to groundwater. The field investigation and the treatability study will be completed in late 2004.

PROPOSED PLAN

Future plans include a field scale pilot test of a successful bench scale treatment technology for in-situ treatment of explosives contaminated subsurface soils. Following completion of the pilot test, a CMS report will be prepared to show the comparative analysis of the treatment technologies for the groundwater system including subsurface soils. Implementation of the CMI for groundwater will be dependent on the results of the CMS to be completed in 2005.

TOLUENE STORAGE AND DISTRIBUTION SYSTEM (SWMU 12) VAAP-36

SITE DESCRIPTION

Site VAAP-36, the Toluene Tanks and Distribution System, was a network of above ground storage tanks, pipelines, and distribution systems utilized to store and distribute toluene in support of the manufacture of TNT at VOAAP. Toluene was conveyed to VOAAP via a pipeline from a terminal on Chickamauga Lake at Turkey Foot Slough. At VOAAP, the pipeline was split into two lines, conveying the toluene to storage tanks on low ridges along the east and west flanks of the TNT Manufacturing Valley. The toluene pipeline to the western storage tanks traversed essentially north to south along the western portion of VAAP-02, then east to the tanks. The toluene pipeline to the eastern storage tanks was located along the northern perimeter of VOAAP where it traversed east underground until the vicinity of the Redwater Treatment Plant, and then the pipeline continued above ground to the east and then south along the eastern edge of VAAP-01. Toluene was delivered from the storage tanks to the manufacturing facilities through two distribution systems. From the storage tanks east of VAAP-01, toluene was gravity fed through pipelines to production lines and day storage tanks in the manufacturing valley. From storage tanks in VAAP-02, toluene was gravity fed through distribution lines into railcars and transported to the production lines.

STATUS

RRSE RATING: Medium

CONTAMINANTS: VOCs

MEDIA OF CONCERN: Groundwater, Soil

COMPLETED IRP PHASE: RFA

CURRENT IRP PHASE: RFI

FUTURE IRP PHASE: None

Soil and groundwater sampling were completed at a reported toluene spill location near the storage tanks located in VAAP-02. Low levels of toluene were detected in soil near the spill site. A shallow groundwater well (MW-123) was installed and toluene was detected at a concentration of 1.6 micrograms per liter in this well. A bedrock groundwater monitoring well was also installed (MW-124); toluene was not detected in this well.

An Environmental Site Assessment was completed in 2003 including a soil gas study and confirmation sampling along the pipeline from the terminal to VOAAP, along the northern perimeter of VOAAP, and up to the former storage tank locations east of VAAP-01. The pipeline located in VAAP-02 was not tested as part of this study. A monitoring well (MW-168) was installed in the vicinity of the eastern storage tanks in 2003. Toluene was not detected in soil during drilling of this well except immediately above the groundwater interface. Toluene was detected at a concentration of 250,000 micrograms per liter in groundwater at this well.

PROPOSED PLAN

Additional groundwater well installation and sampling is planned for the eastern storage tank area to delineate the toluene groundwater contamination found at well MW-168; this groundwater sampling will be addressed under VAAP-35. Sampling in support of delineation of soil contamination at the Old East Acid Area (VAAP-01) is planned during implementation of the corrective measure at that site, including locations adjacent to the distribution system pipelines in that area, as the pipelines pass through and around the site.

A soil gas study with confirmation sampling is planned for completion during an interim corrective measure at VAAP-02 in 2004-2005. Additional surface and subsurface soil sampling is also planned at the locations of the storage tanks and rail distribution system as part of the corrective measure.

MISCELLANEOUS DISPOSAL AREAS (AOC 14)
VAAP-37

SITE DESCRIPTION

Site VAAP-37, Miscellaneous Disposal Areas, consists of small areas in various locations at VOAAP that were used to dispose of debris from former operations or demolition of former facilities at the site. Currently, two disposal areas are included in the site. A debris pile is located adjacent to and west of the New Acid Area (VAAP-33). The debris pile consists of remnants of large concrete storage tank saddles, broken pieces of piping and bricks, and mounds that are covered with soil and vegetation. The origin of the debris is not known, but was likely from demolition of a former facility and appears to pre-date construction of the New Acid Area. A second area of debris is located adjacent to and just south of the site known as the Figure Eight Area, or AOC-10b; AOC-10b is part of site VAAP-32. Debris at this site was found on the side of a shallow ravine and includes large pieces of broken lead and graphite piping, graphite rods, broken glassware, and broken clay tiles and bricks. The origin of this debris is not known; however, similar debris is located at the Old East Acid Area (VAAP-01).

Limited surface and subsurface soil sampling was conducted at the debris pile adjacent to VAAP-33 during the RFI for that site. Results indicated elevated levels of lead along with low levels of PCBs. Low levels of contamination were found at depths up to 25 feet below ground surface. The material and surrounding soil at the debris area adjacent to AOC-10b has not been characterized.

STATUS

RRSE RATING: Medium
CONTAMINANTS: Lead, PCBs
MEDIA OF CONCERN: Soil
COMPLETED IRP PHASE: RFA
CURRENT IRP PHASE: RFI
FUTURE IRP PHASE: None

PROPOSED PLAN

Additional sampling to determine the presence or absence and extent of contamination at the debris pile adjacent to VAAP-33 is planned. Based on the results, it is anticipated that a removal action to remove the contaminated portions of the old debris pile will be required. Materials at the debris area adjacent to AOC-10b will require sampling to determine if contamination is present, along with soil in the vicinity of the debris. If contaminated, the debris and soil will require removal.

MMRP SITES AT VOLUNTEER AAP

Fall 2004/ Working

United States Army

Army Environmental Database

MR Site Summary

This report provides a list of all Sites for the Installation(s) selected. Information is derived from data stored in the AEDB Restoration Module. Runtime filters are listed in a separate section at the end of the report.

Oversight: SOUTHEAST
MSC:
Installation: VOLUNTEER AAP **State:** TENNESSEE
FFID: TN213820933

Site ID	Program	Sub-program	RAC	CTT Status	Site Acres	MR Ownership	Ordnance Types
VAAP-001-R-01	ER,A	MR	5 NEGLIGIBLE RISK	Closed	.1	DoD	Small Arms, expended
VAAP-002-R-01	ER,A	MR	5 NEGLIGIBLE RISK	Closed	.25	DoD	Small Arms, expended

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AEDBR

Schedule

PAST MILESTONES

PAST PHASE COMPLETION MILESTONES:

IRP	Completion Date
Installation Assessment	May 1978
Contamination Survey - Phase I	February 1981
Contamination Survey - Phase II	July 1983
RI/FS Completed	July 1987
Follow-On RI/FS	August 1988
Off-Post Sampling	March 1990
Resampling of Off-post Wells	December 1990
Draft Site Investigation (7 Sites)	June 1995
Draft Remedial Investigation (RI) II	August 1995
Closure Landfill	April 1996
Closure Plan - Burning Ground	May 1997
Draft Feasibility Study	July 1997

PROJECTED MILESTONES

PROJECTED PHASE COMPLETION MILESTONES:

IRP	Completion Date
RFI	September 2005
CMS	September 2006
Remedial Design	September 2006
Remedial Action (Construction)	September 2008
*Remedial Action (Operation)	N/A
Projected Completion Date of IRP	April 2020

* Projected deletion from the National Priorities List is not applicable to VOAAP.

NO FURTHER ACTION SITES

The following sites currently require no further action under the ER,A program:

VAAP-03 ..... Pistol Range
VAAP-04 ..... Environmental Lab
VAAP-06 ..... New Storage Area (Exp Mag)
VAAP-15 ..... Burning Ground/New LF
VAAP-16 ..... Burning Ground (WWII)
VAAP-23 ..... Magazine Area RWA-GS Landfill
VAAP-30 ..... Mustard Agent Spill (1947, Cleaned)
VAAP-33 ..... New Acid Area
VAAP-34 ..... WW Treatment Ponds (Pond 4,5,+COE)

Schedule

Volunteer Army Ammunition Plant Installation Action Plan Schedule

(Based on Cost-to-Complete current funding constraints)

CURRENT PHASE FUTURE PHASE

AEDB-R#	Site Name	RRSE	Phase	FY05	FY06	FY07	FY08	FY09	FY10	FY11+
VAAP-01	Old East Acid Area	High	CMI(C)							
VAAP-20	Construction Debris Disposal Area	Med	DES							
			CMI(C)							
			LTM							
VAAP-21	Landfill (WWII)	Med	DES							
			CMI(C)							
			LTM							
VAAP-31	Warehouse and Pesticide Storage	Low	RFI							
			CMS							
			DES							
			CMI(C)							
VAAP-32	TNT Mfg Valley/incl Rdwtr Treatment Plt	High	CMI(C)							
VAAP-35	Groundwater	High	CMS							
			DES							
			CMI(C)							
			LTM							
VAAP-36	Toluene Storage and Distribution System	Med	RFI							
VAAP-37	Miscellaneous Disposal Areas	Med	RFI							

Remediation Activities

COMPLETED REM/ICM/CMI:

VOAAP has a total of 18 validated AEDB-R sites. Twelve (12) sites are addressed as part of the current SI and RI/FS. A new AEDB-R site was established for groundwater. RFI/CMS phases are being completed as required by the RCRA Order.

The National Environmental Technology Test Site established in 1994 was discontinued in 1997.

In 1994 off-post groundwater contamination was discovered in residential wells near Chickamauga Lake. Bottled water was supplied to these residents until they were connected to the public water supply in 1996-97.

Soil remedial actions were completed in the Western Magazine Area in 2001, and at the Burn Cage and Burning Ground/New landfill site in 2003.

A report of findings has been submitted to the Tennessee Department of Conservation (TDEC) and USEPA for five (5) sites requesting concurrence for no further action (NFA). One (1) Interim Removal Action (IRA) at the Western Magazine Area was completed prior to the RCRA Order.

In addition, one IRA was implemented prior to the RCRA Order, and a final report was approved in December 2003 (Vanadium Pentoxide Area).

CURRENT REM/ICM/CMI:

Interim Corrective Measures were implemented in 2004 to remove contaminated soil at AOC 10b (Figure Eight Area) and at AOC 4 (Pellet Disposal Area); both areas are part of VAAP-32. Sampling at Redwater Ash Handling Area (AOC 11) indicated that no further action was warranted. In addition, removal of explosives-contaminated soil at the Railcar Loading Area in VAAP-05 was also completed in 2004.

FUTURE REM/ICM/CMI:

Future remedial action decisions will be made in partnership with the USEPA, State regulators and the RAB. Some soil remediation will be required, and the particular technology will be identified upon acceptance of the CMS and ICM plans.

RESTORATION ADVISORY BOARD (RAB) STATUS

A Restoration Advisory Board has been established and the first meeting held on 19 February 1998. There are 17 members with representatives from the Army, TDEC, USEPA and local citizens.

The RAB meets bimonthly and past activities have included an installation tour, updates from various agencies (GSA, USACE, consultants, the Chattanooga/Hamilton County Regional Planning Agency), and special topic discussions (s.a. risk assessment).

RAB members are consulted on each proposed project and their comments considered. A Community Relations Plan has been completed and issued. The RAB members have been briefed on the plan. The Community Relations Plan will be updated on an as-needed basis.

An informative website for Volunteer AAP has been established and is active. The VOAAP restoration team and the community restoration advisory board have been given an opportunity to view the web site and offer input. Comments were received from several individuals and team members, and revisions to the web site have been completed. The web site will be available for public viewing by either going directly to the web site address or by a link on the Tennessee Department of Environment and Conservation web page. The web site will be periodically updated as needed.